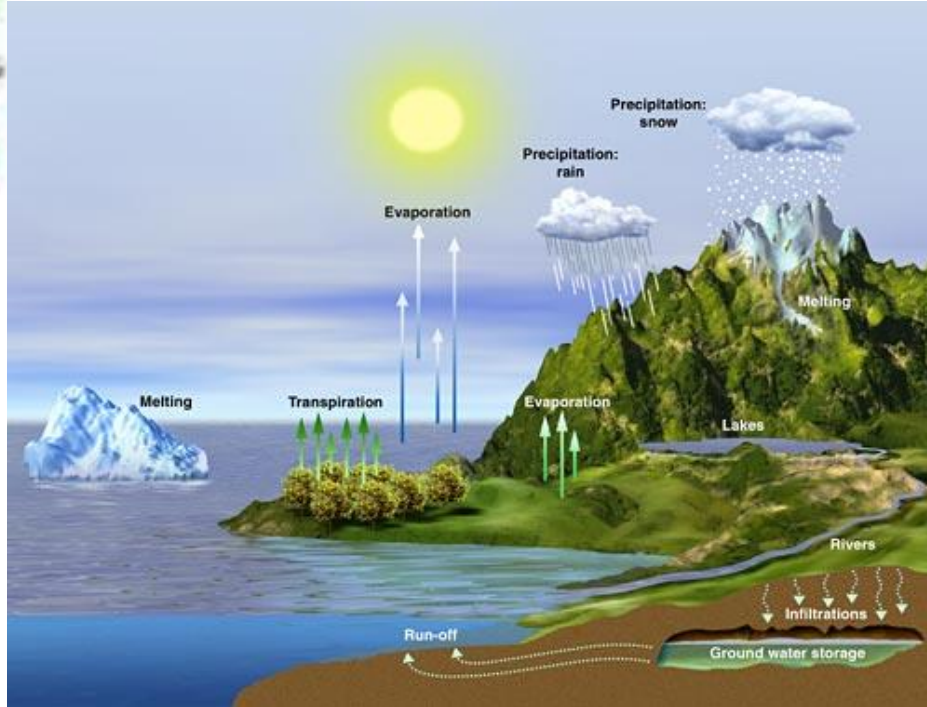


Development of scientific bases of wastewater treatment from harmful by-products of triclosan disinfection

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Triclosan - Broad- spectrum antimicrobi al agent



✓Antibiotic resistance is an increasingly serious problem worldwide, and continued use of the biocides exacerbates this problem.

Both Triclosan and its transformation products are found in wastewater treatment plants effluent, about 96% of Triclosan from consumer products is disposed of in residential drains.

This leads to large loads of this chemical in water entering wastewater treatment plants, which are incompletely removed during the wastewater treatment process.

Triclosan also accumulates in the environment, contaminating surface and groundwater

Aim of the work: Development of scientific fundamentals of the methodology for the purification of waste water and sludge from municipal treatment facilities to ensure the safety and protection of the environment from harmful by-products of triclosan disinfection and the conduct of a scientific and environmental assessment of the environmental impact assessment of triclosan

Method or methodology of the work: Drop profile tensiometer for measuring surface and interfacial tension, UV-visible spectroscopy, scanning electron microscope, X-ray fluorescence spectrometry, polarography, photoelectrocolorimetry, defactometry, adsorption microextraction with high-performance liquid chromatography with diode-matrix detection, and Quantachrom pore size analyzers.

The results of the work and their novelty: The analysis of data for the purpose of conducting of the environmental monitoring: assessment of sewage sludge of municipal treatment facilities (MTF) and a methodology for wastewater treatment has been developed. The physico-chemical, colloid-chemical properties of sewage, thawed, communal waters, MTF water have been studied. A scientifically based approach to the selection of sorbents for the purification of liquid effluents is proposed, adsorption of triclosan, methyl-triclosan and its chlorine derivatives from liquid systems by domestic (coal charge of absorbers GP5, diatomite) and foreign sorbents (ISQ_DON) is studied. Sorbents have been developed for wastewater treatment from triclosan and its derivatives on the basis of coal charge from the absorber GP5 for the purpose of utilizing wastes from the chemical industry and also on the basis of natural raw materials. Adsorption of triclosan on diatomite from sewage in Almaty was investigated. The optimum concentration of sorbent for 80% of wastewater treatment from triclosan was determined. Based on the research set, an integrated methodological approach was developed.

Scientific novelty of the results.

For the first time, the scientific basis of the methodology for wastewater treatment of municipal wastewater treatment plants has been developed to ensure the safety and protection of the environment from harmful by-products of triclosan disinfection in the Republic of Kazakhstan.

A quantitative assessment of triclosan and its by-products in model solutions was carried out and the efficiency of triclosan purification by domestic and foreign sorbents was determined.

For the first time, the effectiveness of the sorbent GP5 (coal charge of the absorber from the gas mask) and its activated form- the waste of production for wastewater treatment and model solutions from triclosan is determined.

The General constructional, technological and technical-operational characteristics.

The solutions developed within the framework of the project have the following constructive and technological and technical and operational characteristics: ecological compatibility of sorbents, use of domestic raw materials, increase of efficiency due to lower concentration and higher efficiency.

Degree of implementation: On the basis of the obtained research results, the application for the innovative patent "The method of obtaining the triclosan sorbent for the purpose of utilizing the absorbers of GP5"

Recommendations for implementation or results of implementation of research works. It is recommended to implement the results of R & D for sewage and municipal water treatment

Application area: Municipal waste water treatment plant.

Economic efficiency or significance of the work: The use of domestic sorbents for wastewater treatment in the Republic of Kazakhstan is extremely important both for import substitution and increasing the efficiency of new sorbents and thereby for improving the competitiveness of the economy of the Republic of Kazakhstan, and for ensuring the safety and protection of the environment from ecotoxic carcinogenic byproducts of triclosan disinfection and improving the ecological situation in Kazakhstan in whole.

The scientific significance of the work is to expand modern concepts in the field of adsorption of triclosan, methyl-triclosan and its chlorine derivatives from liquid systems by domestic and foreign sorbents.

Forecast proposals on the development of the research object (R & D, business incubation, commercialization, etc.): The results of research are recommended for use in municipal sewage treatment plants in the cities of the Republic of Kazakhstan to ensure the safety and protection of the environment from ecotoxic carcinogenic byproducts of triclosan disinfection.